

Leveraging a Flexible, Multidimensional Framework for Navy Force Planning & Policy Analysis

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Navy Workforce
Conference, 2008



SKIPPER-III

- **Developed out of an NPRST R&D effort under EMPIPS**
- **Proven Utility in Enlisted Plans & Policy Branch**
- **Easy to Use Interface**
 - New visual and cognitive techniques facilitate usage and understanding
 - “Open Box” Model
- **Web-based**
- **Integrated, Expandable Modeling Framework**
 - Multi-year Inventory Projection (Operational)
 - EMF-based historical data can be overridden by ECMs
 - Recruit/A-School Optimization and Conversion Planning (Operational)
 - ALNAV LOS Force Strength Planning Support Capabilities (Operational)
 - Advancement and Rotation Models (in R&D)
- **Straightforward Development Path to Explore ACDU Enlisted C-School Planning, ACDU Officer Planning and Reserve Planning**

Enlisted Manpower and Personnel Integrated Planning System (EMPIPS)

- An **NPRST R&D effort**
 - ONR funded
- **Develop Prototype Models and a Portal for Work Process, Data and Tool Integration for use by Enlisted Personnel Planning Managers**
 - Development of Tools
 - Integration of Decision Support Systems
 - Integration of Data and Information
 - Web enabled

EMPIPS Portal & Force Health Monitor Vision

SAP Portals Enterprise Portal 5.0 - Microsoft Internet Explorer

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Address: <http://empips2.dyncorp.com/sapportal>

Force Health Monitor

Sep FY01 DC EMSW EN GS GSE GSM HT ICSW MM

Strength	Green	Yellow	Yellow	Green	Yellow	Green	Green	Yellow
Reenlistments	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Yellow
PG Dist	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Sea-Shore Dist	Yellow	Red	Red	Green	Green	Yellow	Yellow	Yellow
LOS Dist	Red	Red	Red	Red	Yellow	Red	Red	Yellow

Model Data Integrator

Search Criteria Available Data

Skill Code: ALNAV, Browsed, Exact Dmg, Health Measure: Reenlistments for Skill MM

Datakind: All, Data Origin: All

Tool Launcher: Policy Formulation (Recruiting, SKIPPER-III), Reports (Billet Structure, WebTarget)

SKIPPER Data Driven - Microsoft Internet Explorer

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Address: <http://empips.dyncorp.com/skipperiii/datadriven.asp>

Skill: MMSW (B130) Scenario: MM FY04 School Plan: MM FY04 Accession Plan

Skill Level: EMC Model: Rotation Data: Total Non-School Gains

PG Historic Inv. Inventory Projections

LDS	FY02	9/02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
1 - 6	3,813	3,813	3,719	3,558	3,497	3,477	3,433	3,470	3,597	3,710
7 - 10	901	901	1,005	1,131	1,177	1,237	1,293	1,280	1,244	
11 - 14	628	628	556	550	530	555	610	681	715	751
Other	2,568	2,568	2,361	2,113	1,897	1,633	1,433	1,249	1,117	1,062
B3	1,146	1,148	785	740	600	648	648	660	720	749
E4	2,613	2,613	2,787	2,656	2,543	2,434	2,350	2,260	2,219	2,247
E5	1,500	1,500	1,542	1,485	1,476	1,426	1,409	1,410	1,409	1,409
E6	1,530	1,530	1,484	1,443	1,463	1,403	1,382	1,382	1,382	1,382
E7	812	812	770	751	748	730	723	723	723	723
E8	187	187	164	162	166	162	160	160	160	160
E9	120	120	109	105	105	99	97	96	96	97
Total	7,910	7,910	7,841	7,352	7,101	6,902	6,763	6,691	6,709	6,767
EPA	8,008	8,008	7,642	7,354	7,318	6,928	6,771	6,771	6,771	6,771
INV/EPA	98.7	98.7	99.9	99.9	97	99.6	99.9	99.8	99	99.9
Losses	0	0	1,375	1,379	1,398	1,398	1,306	1,288	1,265	1,242
Gains	1,510	1,510	1,106	1,091	1,134	1,200	1,172	1,210	1,284	1,293

Overrides

Skill	Data	Name	03	04	05	06	07	08	09	10
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Health Measure: Reenlistments for Skill MM - Microsoft Internet Explorer

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Address: <http://empips.dyncorp.com:8080/ForceHealthMonitor/HealthMeasure.jsp?measure=Reenlistments/skill=MM&dateIndex=6>

Health Measure History

MM Health Measure: Reenlistments

Explanation: Ratio health measures divide actual data by target data (here, Reenlistments / ReenlistmentTargets). A score of 1.0 is perfect.

Color key: Red Problem, Yellow Warning, Green Satisfactory

Show actual and target data: Reenlistments / ReenlistmentTargets for Sep FY01

Recommended actions

Reenlistments Ratio Health Measure Data

MM Reenlistments Compared To ReenlistmentTargets

Explanation: This graph compares Reenlistments to ReenlistmentTargets over time.

Health status color key: Red Problem, Yellow Warning, Green Satisfactory

Health measure history

Recommended actions

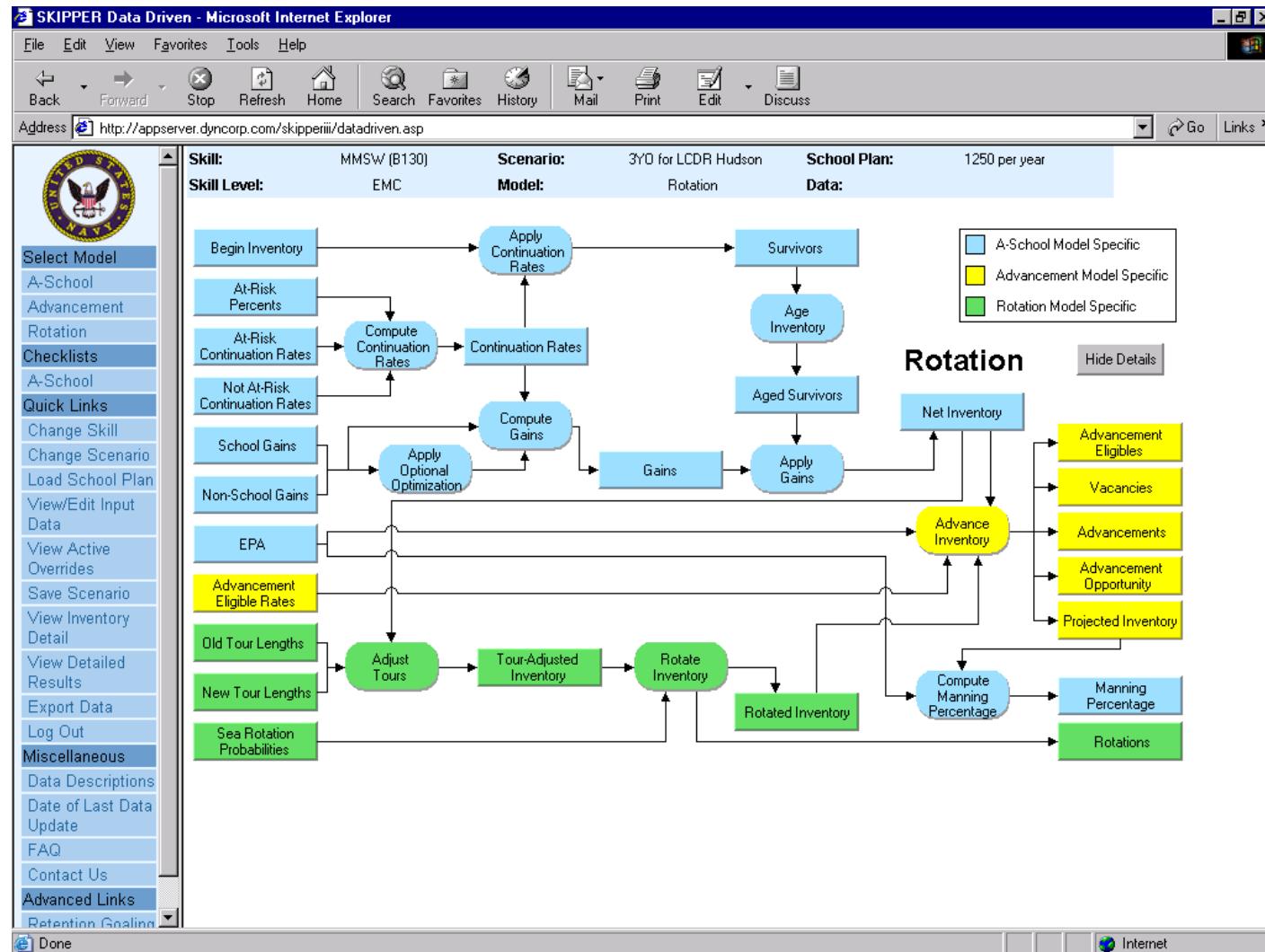
Reenlistments (blue) vs. ReenlistmentTargets (black)

Annual report on reenlistment policy (report)

Enlisted Advancements Plan E5-E6 (spreadsheet)

Terrorist attack on America (email)

Accession, Advancement and Sea/Shore Rotation Model Processes



Projected Inventory Results

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Address <http://empips.dyncorp.com/skipperiii/datadriven.asp> Go Links »



Skill: MMSW (B130) **Scenario:** MM FY04 **School Plan:** MM FY04 Accession Plan

Skill Level: EMC **Model:** Rotation **Data:** Total Non-School Gains

Historic Inv. **Inventory Projections**

PG	LOS	FY02	9/02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
1 - 6	3,813	3,813	3,719	3,558	3,497	3,477	3,433	3,470	3,597	3,710	
7 - 10	901	901	1,005	1,131	1,177	1,237	1,293	1,291	1,280	1,244	
11 - 14	628	628	556	550	530	555	610	681	715	751	
Other	2,568	2,568	2,361	2,113	1,897	1,633	1,433	1,249	1,117	1,062	
B3	1,148	1,148	785	740	600	648	648	660	720	749	
E4	2,613	2,613	2,787	2,666	2,543	2,434	2,350	2,260	2,219	2,247	
E5	1,500	1,500	1,542	1,485	1,476	1,426	1,409	1,410	1,409	1,409	
E6	1,530	1,530	1,484	1,443	1,463	1,403	1,382	1,382	1,382	1,382	
E7	812	812	770	751	748	730	723	723	723	723	
E8	187	187	164	162	166	162	160	160	160	160	
E9	120	120	109	105	105	99	97	96	96	97	
Total	7,910	7,910	7,641	7,352	7,101	6,902	6,769	6,691	6,709	6,767	
EPA	8,008	8,008	7,642	7,354	7,318	6,928	6,771	6,771	6,771	6,771	
INV/EPA	98.7	98.7	99.9	99.9	97	99.6	99.9	98.8	99	99.9	
Losses	0	0	1,375	1,379	1,386	1,398	1,306	1,288	1,265	1,242	
Gains	1,510	1,510	1,106	1,091	1,134	1,200	1,172	1,210	1,284	1,299	

Overrides

Skill	Data	Name	03	04	05	06	07	08	09	10

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Internet

A-School Planning

- **“What If” Capability**
 - EPA targets, school lengths and capacities, and personnel flow rates overrideable
 - Powerful scenario management
- **Descriptive Mode**
 - Projects inventories and manning % given School and Non-School gains
- **Prescriptive Mode**
 - Determines optimal number of A-School inputs to meet EPA target
 - Unconstrained
 - Constrained Options
 - Maximum School input %deviations
 - Freeze/minimum School inputs
 - Enforce A-School capacity limits
 - Never exceed EPA

Entering Inputs

SKIPPER Data Driven - Microsoft Internet Explorer

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Address: http://empips.dyncorp.com/kipperiii/dataldriven.asp

Skill: MMSW (B130) Scenario: School Plan: Total Non-School Gains

Skill Level: EMC Model: A-School Data: Total Non-School Gains

School Plan

Copy to Future FYs Optimize School Inputs Save School Plan Load a Different School Plan View Female Breakout

	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	
School Lengths	4YO A-School 6YO A-School	12 0								
Limit	A-School									
Attrition	4YO A-School 6YO A-School	0.1 0.1								
	CNRC Fleet Input Jobs Input College Fund NTSP Misc Input									
4YO										
	Input to TASP									
6YO	Direct Input Input to TASP									
Gains	Non-School A-School Total	531 979	531 0							
	Inventory Target EPA (100%) Inv/Target EPA (%) EPA Inventory/EPA (%)	7,911 8,008	6,535 7,642	5,346 7,354	4,373 7,318	3,574 6,928	3,003 6,771	2,510 6,771	2,109 6,771	1,797 6,771
Updated										

User Coach

4YO: 6YO: 0.1 0.1 0.1

A-School Limit: 2850

Last year's input (FY02): 730

Expected attrition rate: 0.04

Optimize School Inputs

OK Cancel Help

Overriding EPA

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Address: http://empips.dyncorp.com/kipperiii/datadriven.asp

Skill: MMSW (B130) Scenario: School Plan:

Skill Level: EMC Model: A-School Data: EPA

Override Name: Save

PG FY

PG FY

	B-3	E-4	E-5	E-6	E-7	E-8	E-9	Total
2002	809	2949	1611	1553	806	166	114	8008
2003	785	2800	1542	1484	770	164	110	7842
2004	741	2666	1486	1443	751	162	105	7354
2005	719	2641	1476	1463	748	166	105	7318
2006	674	2433	1426	1403	730	162	100	6928
2007	649	2351	1409	1382	723	160	97	6771
2008	649	2351	1409	1382	723	160	97	6771
2009	649	2351	1409	1382	723	160	97	6771
2010	649	2351	1409	1382	723	160	97	6771

Count

2002 2003 2004 2005 2006 2007 2008 2009

Chart Properties -> Right Click on Mouse
Rotate -> Mouse Drag

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Internet

Model Run

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Address Go Links >

Skill: MMSW (B130) **Scenario:** **School Plan:**

Skill Level: EMC **Model:** A-School **Data:** Total Non-School Gains

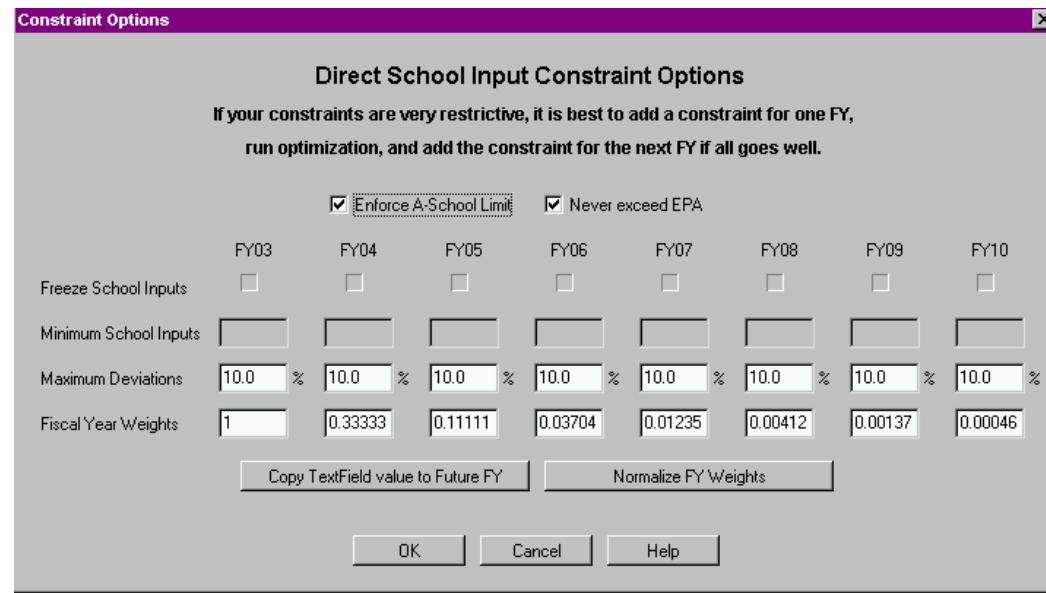
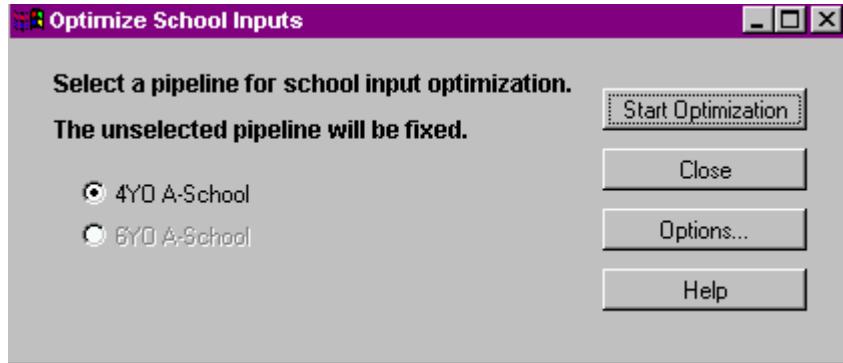
School Plan

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	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
School Lengths	4Y0 A-School	12	12	12	12	12	12	12	12
	6Y0 A-School	0	0	0	0	0	0	0	0
Limit	A-School	2,850	2,850	2,850	2,850	2,850	2,850	2,850	2,850
Attrition	4Y0 A-School	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	6Y0 A-School	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
4Y0	CNRC	730	730	730	730	730	730	730	730
	Fleet Input								
	Jobs Input								
	College Fund								
	NTSP								
	Misc Input								
	Input to TASP								
6Y0	Direct Input								
	Input to TASP								
Gains	Non-School	531	531	531	531	531	531	531	531
	A-School	979	700	700	700	700	700	700	700
	Total	1,510	1,231	1,231	1,231	1,231	1,231	1,231	1,231
Updated	Inventory	7,910	7,657	7,397	7,125	6,843	6,665	6,514	6,408
	Target EPA (100%)	8,008	7,642	7,354	7,318	6,928	6,771	6,771	6,771
	Inv/Target EPA (%)	98.77	100.19	100.58	97.36	98.77	98.43	96.2	94.63
	EPA	8,008	7,642	7,354	7,318	6,928	6,771	6,771	6,771
	Inventory/EPA (%)	98.77	100.19	100.58	97.36	98.77	98.43	96.2	94.63

[Retention Goal](#) [Advanced Links](#) [Data Descriptions](#) [Date of Last Data Update](#) [FAQ](#) [Contact Us](#) [Done](#) [Internet](#)

Using Optimization



Optimized Results - C-School Planning Model

proof of concept

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Address <http://appserver.dyncorp.com/kipperiii/datadriven.asp>



Skill: MN (C160) **Scenario:** MN-0410 C-School Plan POC **School Plan:** C-School Plan
Skill Level: EMC **Model:** A-School **Data:** Total Non-Sch

C-School Plan

Copy to Future FYs Optimize School Inputs Save School Plan Load a Different School Plan View Female Breakout Export

	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Length (weeks)	C-School	6	6	6	6	6	6	6	6
Limit	C-School	0	0	0	0	0	0	0	0
Attrition	C-School	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Input	C-School	32	40	50	47	40	41	41	41
Gains	Reutilizations	5	5	5	5	5	5	5	5
	C-School	32	38	48	46	40	40	40	40
	Total	37	43	53	51	45	45	45	45

Updated	Strength	68	79	93	101	101	101	101	101
	Target EPA (100%)	100	103	103	103	103	103	103	103
	Str / Target BA (%)	68.0%	76.69%	90.29%	98.05%	98.05%	98.05%	98.05%	98.05%
	BA	100	103	103	103	103	103	103	103
Strength / BA (%)	68.0%	76.69%	90.29%	98.05%	98.05%	98.05%	98.05%	98.05%	

Unconstrained Optimization Results - C-School Plan

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Address <http://appserver.dyncorp.com/skipperiii/datadriven.asp>



Skill: MN (C160) **Scenario:** MN-0410 C-School Plan POC **School Plan:** C-School Plan
Skill Level: EMC **Model:** A-School **Data:** Total Non-Scl

C-School Plan

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	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Length (weeks)	C-School	6	6	6	6	6	6	6	6
Limit	C-School	0	0	0	0	0	0	0	0
Attrition	C-School	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Input	C-School	32	71	37	41	42	41	41	41
Gains	Reutilizations	5	5	5	5	5	5	5	5
	C-School	32	65	40	40	41	40	40	40
	Total	37	70	45	45	46	45	45	45

Updated	Strength	68	101	101	102	101	101	101	101
	Target EPA (100%)	100	103	103	103	103	103	103	103
	Str / Target BA (%)	68.0%	98.05%	98.05%	99.02%	98.05%	98.05%	98.05%	98.05%
	BA	100	103	103	103	103	103	103	103
Strength / BA (%)	68.0%	98.05%	98.05%	99.02%	98.05%	98.05%	98.05%	98.05%	

Accession Modeling - ACDU vs. SELRES

<i>High Level Concepts</i>	ACDU	SELRES
EPA or Target	EMC x PG	Rating x PG
Begin Inventory	Skill x LOS x PG	Rating x PG x LOS/YQS
- Losses	At-Risk CR, Not-At Risk CR	Died, Retired, HYT, Discharged, ACDU, IRR (quit drilling, reg. transfer)
+ Gains	School, Non-School	ACDU, NPS, IRR, Lateral/Other
+/- Advancement*	Vacancy Driven Examined, Non-Examined	Vacancy Driven Examined, Non-Examined
Sea/Shore Rotation*	Rotation path probabilities (Sea to Shore, etc.) Tour lengths (PST and NST)	N/A
End Inventory	Skill x LOS x PG	Rating x PG x LOS/YQS

***In Development**

Sea-Shore Rotation Modeling

- **Inputs**
 - Begin inventories with Time-to-PRD
 - Tour lengths (PST and NST)
 - Rotation path probabilities (Sea to Shore, etc.)
 - Phase-in logic
 - IA time between rotations, initial IA time and TPPH
 - EPA, School/Non-School Gains, Continuation Rates, etc.
- **Outputs by EMC, Paygrade and LOS**
 - Projected Inventories by Sea/Shore/IA
 - Projected Rotations to Sea/Shore
- **Ready for 6.5 Transitioning**

Begin and Projected Inventories (FY10) by S/S and LOS

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	Sea	Shore	Total
1	65	21	86
2	149	98	247
3	207	68	275
4	268	99	367
5	114	137	251
6	52	103	155
7	51	75	126
8	60	89	149
9	38	63	101
10	79	74	153
11	81	51	132
12	58	25	83
13	60	70	130
14	21	71	92
15	44	67	111
16	74	68	142
17	84	51	135
18	98	59	157
19	72	66	138
20	59	80	139
21	26	63	89
22	14	46	60
23	9	34	43
24	7	9	16
25	9	9	18
26	5	6	11
27	2	3	5
28	0	3	3
29	0	2	2
30	1	3	4
31	0	0	0
Total	1807	1613	3420

Select Model A-School Advancement Rotation Checklists A-School Quick Links Change Skill Change Scenario Load School Plan View/Edit Input Data View Active Overrides Save Scenario View Inventory Detail View Detailed Results Export Data Log Out Miscellaneous Data Descriptions Date of Last Data Update FAQ

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Google

	Sea	Shore	Total
1	68	0	68
2	135	1	136
3	150	0	150
4	153	0	153
5	125	1	126
6	11	100	111
7	1	106	107
8	2	96	98
9	84	14	98
10	114	2	116
11	115	0	115
12	144	0	144
13	14	106	120
14	1	88	89
15	1	79	80
16	80	12	92
17	78	1	79
18	122	1	123
19	120	1	121
20	8	67	75
21	0	78	78
22	31	5	36
23	31	0	31
24	3	24	27
25	0	22	22
26	14	2	16
27	6	0	6
28	0	4	4
29	0	1	1
30	1	0	1
31	0	0	0
Total	1612	811	2423

Count

160
140
120
100
80
60
40
20
0

1 3 5 7 9 11 14 17 20 23 LOS

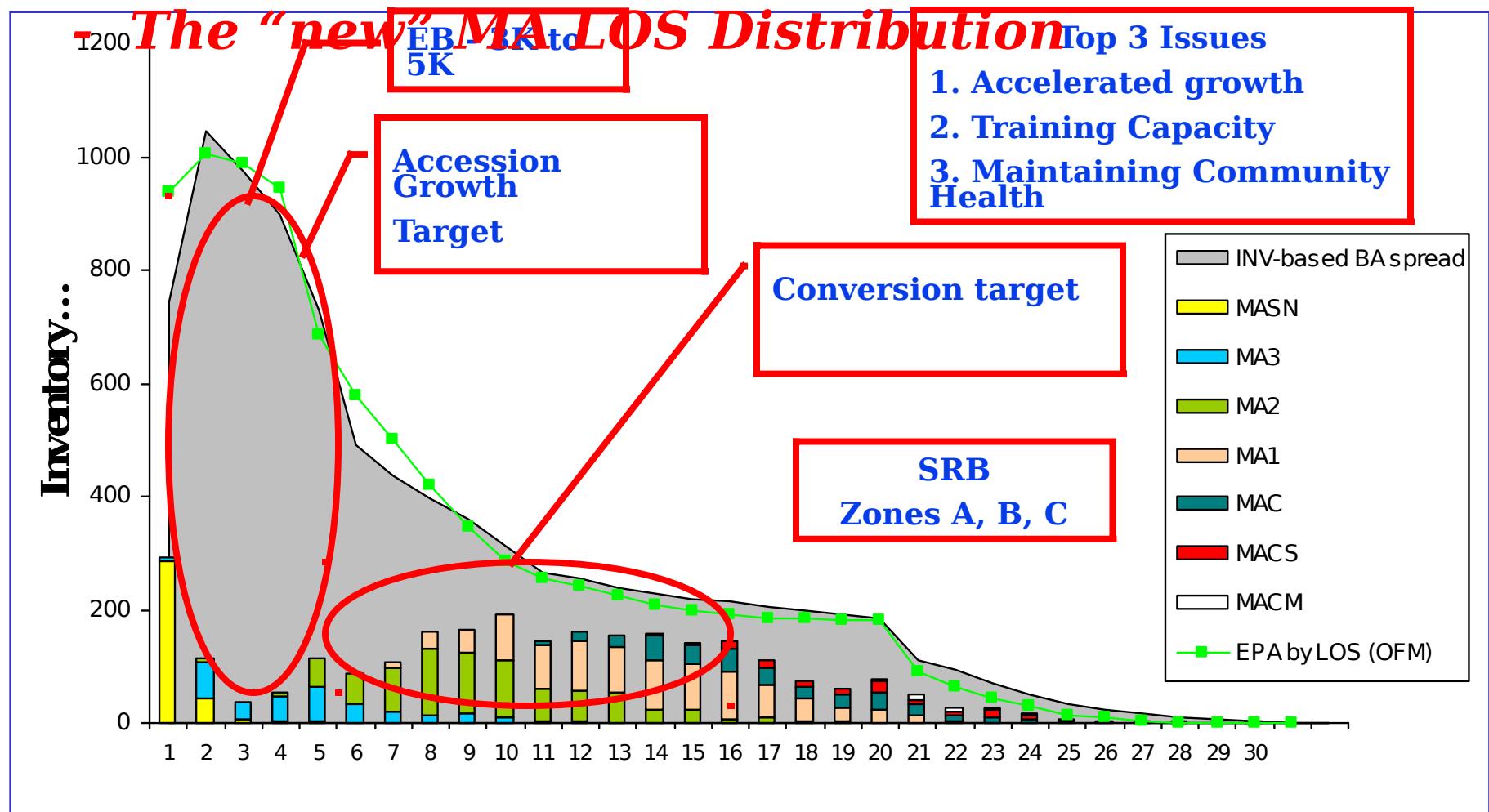
Chart Properties -> Right Click -> Rotate -> Mouse Drag
Depth Change -> Mouse Drag with S
Edit -> Mouse Drag with Ctrl key

Select Model A-School Advancement Rotation Checklists A-School Quick Links Change Skill Change Scenario Load School Plan View/Edit Input Data View Active Overrides Save Scenario View Inventory Detail View Detailed Results Export Data Log Out Miscellaneous Data Descriptions Date of Last Data Update FAQ

SRB Justification and Decision Support

- **Leverage existing N132 and NPRST econometric studies/results**
- **More cost effective SRB allocations in the context of projected reenlistment and manning ROI, SRB budgets, and training and distribution**
- **Proof of concept developed under N132 guidance**
- **Current Strength, Inventory and Manning by NEC and Source Rating**
- **Target BA by LOS**
- **Projected Reenlistments and Manning % for Proposed Multiples**
- **Summary/Rollup, Budget Reconciliation and Tracking Tool**

Defining a target paygrade structure by LOS



Officer Modeling

- **Utilize SKIPPER-III framework**
- **Within-year Officer Loss Forecasting (WOLF) utilizing some features of the N-Dimensional array modeling infrastructure**
- **Fully leverage SKIPPER-III in support of inventory management**
 - Accession Planning
 - Promotion Planning
 - Project Laterals

Summary

- **Existing Enlisted Decision Support Tools**

- All work done through NPRST under 6.2/6.3 R&D
 - Proven Utility in Enlisted Plans & Policy Branch
 - SKIPPER-III (EMC and ALNAV)
 - Integrated, Expandable Navy Personnel Modeling Framework
 - Provides means to Transition towards Goal
 - Objective Force Model (ALNAV) provides Steady State Goal Determination

- **Numerous Other Capabilities close to transitioning**

- Proof of concepts / prototypes completed
 - Leverage proven Projection Technology to complete Sea/Shore, Advancement, SRB Justification & C-School Planning Tools and Rollup/Reconciliation T&E
 - Explore Force Transition Alternatives and Force Health Monitoring Trends
 - Recruiting vs. Retention, Force Size and Shape, Costs/ROI, etc.

Contact Information

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